which acts as a "*tie-beam*" to a portion of the arch, and without much expenditure of force supports the weight of the body placed on the vertex of the straddling arch formed by the tail and hind feet.

I do not know of any other animal in which the quadratus femoris is inserted so low down on the femur, nor of any in which, as in the kangaroo, a special trochanter is provided for the insertion of this muscle. Its weight is

In the Giant Kangaroo	1·47 oz.
In the Wallaby	0·91 „

The relative *moment* of the quadratus femoris in man, the Quadrumana, and the kangaroos may be seen from the following comparison: in all cases the total weights of the hip-joint muscles being called 100, the quadratus femoris forms of the hip-joint muscles

In Man	1·25 per cent.
In the Chacma	3·01 „
„ Green Monkey	3·00 „
„ Macaque	4·01 „
„ Wallaby Kangaroo	5·06 „
„ Giant Kangaroo	3·77 „

XXIV.—*On the Freshwater Fishes of Algeria.*

By Paul Gervais*.

In a memoir published as long ago as the year 1853†, I gave some descriptive details of the fishes which had then been collected in Algeria in the different streams and in some lakes of that country, and showed how little they varied specifically. Including *Coptodus* and *Tellia*, both differing generically from European fishes, the number amounted only to seven, namely, *Coptodus Zillii*, a species of *Tilapia*; *Zillia apoda*, of the family of *Cyprinodontes*; a Bleak (*Leuciscus callensis*, Guichenot); three Barbels, one of which even is contestable (*Barbus callensis*, Val., *B. setivimensis*, Val., and *B. longiceps*?, Val.); lastly, an Eel, to which M. Guichenot also thought it necessary to give a specific name (*Anguilla callensis*). This list has since been increased only by two interesting species, a Trout (*Salar macrostigma*, A. Duméril ‡) and a *Cyprinodon* (*C. doliatus* and *cyanogaster*,

* Translated by W. S. Dallas, F.L.S., &c., from the 'Comptes Rendus,' 17th December 1866, pp. 1051–1058.

† Bull. Soc. d'Agric. de l'Hérault, xl. p. 76; Ann. des Sci. Nat. 3e série, xix.

‡ Revue et Magasin de Zoologie, 1858, p. 396, pl. 10.

Guichenot *). This latter exists also in various localities of the Mediterranean region ; every one knows the geographical distribution of the preceding species.

Having more recently received from M. Paul Marès, a naturalist whose labours with relation to Algeria are appreciated by the Academy, some fishes from that country, with the request that I would examine them, I have been led to revise the results of my former investigation, and can make some additions to it which are not without interest.

The fishes collected by M. P. Marès enable me to add two genera to the above list. I shall avail myself of the opportunity which they present to make some new observations with regard to the *Cyprinodontes,* and to establish more accurately than I could formerly the synonymy of *Coptodus.*

The first of the two genera, new as Algerian, which I shall indicate from the fishes sent to me by M. P. Marès is the genus *Gobius*, the species of which are chiefly marine, but which, nevertheless, furnishes a few to the fresh waters of the south of Europe. Bonelli and Cuvier have mentioned such as occurring in Piedmont and about Bologna; there are also some in eastern Europe, especially in Austria and the south of Russia. Pallas indicated one; and others have been described by MM. Heckel and Nordmann. *Gobius lacteus,* Nordmann, is from the Dniester.

The Algerian *Gobii* were taken in the rivulets of the environs of Guelma; I have been unable to compare them with those previously described, and consequently cannot affirm that they differ specifically from them.

A second genus which had not been observed in Algeria is *Gasterosteus,* well known by its European species. It occurs also in North America, but has not previously been indicated in any part of Africa. Specimens have been taken near Algiers, in the rivulets in the vicinity of the *Maison-Carrée.* They belong to the group of Sticklebacks with three dorsal spines; and their principal characters approximate them to the species or variety common in the environs of Paris, of which Cuvier has made his *Gasterosteus leiurus*; nevertheless some secondary differences allow of their separation, and they seem to constitute a distinct species.

M. P. Marès has also sent me some Cyprinodons. They came, like the Gobies, from the torrents of the environs of Guelma, and do not appear to be specifically distinct from the specimens previously received by M. Guichenot from Biskra. They are likewise very similar to those which Captain Zickel saw issuing with the water from the artesian well bored under his

* Revue et Magasin de Zoologie, 1859, p. 377.

care at Aïn-Tala, as cited by M. Desor in his note on the Algerian Sahara *. Lastly, it is no less difficult to distinguish them from fishes of the same genus which are found in Portugal, Spain, Sardinia, and even in the neighbourhood of the Dead Sea, as well as in other circum-Mediterranean localities. It seems to me that it would be useful to make a careful comparison of the Cyprinodons of these different localities before admitting that they constitute so many distinct species as ichthyologists have supposed. Nevertheless I shall not include in this synonymy, even generically, the *Tellia*, which certainly belongs to the same family as the Cyprinodons, but differs from them by the absence of the ventral fins. The *Tellia* has the mouth clearly different from that of the Cyprinodons, having its aperture more raised; and it is an error to attribute its apodal character to the wearing of its ventrals, as supposed by M. Desor †, since not only the rays of these fins are wanting, but also the pelvic bones which support them in other fishes. This is easily ascertained by the examination of the specimens of *Tellia* deposited by M. Guyon in the Paris Museum, as has been done by M. Valenciennes ‡.

The number of genera of Fish observed in Algeria is thus raised to nine, namely :—

Of the Acanthopterygii, the genera *Coptodus* or *Tilapia*, *Gobius*, and *Gasterosteus*.

Of the Malacopterygii abdominales, the genera *Cyprinodon*, *Tellia*, *Barbus*, *Leuciscus*, and *Salar*.

Of the Malacopterygii apodes, the genus *Anguilla*.

These nine genera only present as yet eleven species, even including *Barbus longiceps*. It has been supposed that Pikes exist in Algeria, and the lake Fetzara has been indicated as containing them; but hitherto this assertion has not been confirmed.

Of the nine genera ascertained, only one, *Tilapia*, to which I have given the name of *Coptodus*, belongs to a family not represented in the fresh waters of Europe. With regard to this I have made some new observations which deserve to be recorded.

This fish has already been found in Algeria at several points in the Sahara-region, at Biskra, Tuggurth, and Tmacin, and in the lake of Farfar. I owe the specimen formerly described by me to M. Zill, a very distinguished naturalist, who sent it to me during my journey to Constantine in 1848; he had brought it from Tuggurth several years before. M. Guyon also

* Bull. Soc. Sci. Nat. de Neuchâtel, 1864.

† *Loc. cit.*

‡ Comptes Rendus, lvi. p. 713 (1858).

possessed specimens of *Coptodus*, which he has deposited in the Museum.

The Coptodon is an Acanthopterygian fish, resembling the Percoids, and especially the Ruffe, in some of its peculiar characters; but it is pharyngognathous, which necessitates its removal into another group; and its maxillary teeth are trenchant and notched, like those of the Glyphisodons, which Cuvier arranges in the family of the Sciænoidei. Moreover its scales are destitute of those numerous little points on the free margin which are observed in those called *ctenoid*; and thus it would be a fish of the great division of the Cycloidei of Agassiz, which forbids its being placed in the same genus as the Glyphisodons, as was proposed by M. Valenciennes*. The scales of *Coptodus* have their margin of insertion festooned, an arrangement which does not occur in all the Cycloidei, but is found in some of them, among which I may cite the *Cyprinodontes*. Moreover the Coptodon is not the only Acanthopterygian in which similar scales may be indicated. M. Agassiz has already pointed out that certain genera of that order present them; and among these he cites various Labroidei, including the *Bolti* of the Nile, associated by Cuvier, in his genus *Chromis*, with several marine species, which are, on the contrary, Ctenoids. The Coracin, or Little Castagneau, represents in the Mediterranean the marine *Chromides*—fishes very different from the Bolti, and which must, indeed, be placed in a different genus, not only on account of the form of their scales, but because their teeth are villiform instead of being trenchant and incised like those of the Bolti, the Coptodon, and the Glyphisodonts. Some authors even think that the marine *Chromides* should be referred to the genus *Helias*, established by Cuvier and associated by him with the Sciænoidei. This is the opinion adopted by Charles Bonaparte in his Catalogue of the Fishes of Europe; and I believe it may very well be sustained.

Thus the Bolti, or *Chromis niloticus*, which M. Peters met with in Mozambique, becomes the type of a small distinct group, characterized by its fluviatile habitat, its trenchant and incised teeth, and its cycloid scales. In Africa (that is to say, on the same continent with it) we find some analogous Fishes.

At a short distance from the Orange River, in some small lakes which are dry during the hottest season, Dr. Andrew Smith discovered an Acanthopterygian very similar to the Bolti, and regarded both by Peters and J. Müller as only differing from it specifically; this is his *Tilapia Sparmanni*†. The natives believe that this fish buries itself in the mud like the Tortoises,

* *Loc. cit.*

† Illustr. Zool. S. Africa, Pisces, pl. 5 (1849).

and thus waits until the excavations in the soil in which it remains during the dry season are inundated afresh. Dr. Smith was unable to verify this statement.

Other fishes having the form of the Bolti live in the Gaboon and in the Senegal. M. A. Duméril* has described nine species of them as distinct, calling them *Tilapia*, this name being adopted by him as that of the genus of which the Bolti is the oldest known form.

It is also in the same division that must be placed *Haligenes Tristrami*, Günther†, taken, like M. Zill's Coptodons, at Tuggurth. Between this fish and the Bolti, or Coptodon, the only difference that I can see is that of the pharyngeal teeth, indicated as cardiform in the specimen brought by Mr. Tristram, which cannot be applied to these teeth taken singly in the Bolti, but becomes conformable to the reality if the author intended, as I suppose, to speak of the bone supporting these teeth.

M. Peters was the first to demonstrate the resemblance which exists between the Bolti, *Tilapia*, and *Coptodon*. Having lately had the opportunity of comparing the Bolti of the Nile with the Coptodon from Tuggurth sent me by M. Zill, I have been able to judge of the correctness of this approximation indicated to me by the learned naturalist of Berlin, and to assure myself that these fishes are certainly of the same species. The similarity of their characters is complete; there is nothing, even to their pharyngeal teeth, both superior and inferior, that does not present the same details of form and arrangement. In both cases we find the same distribution of these teeth, the same inequalities in their size, their villiform appearance, and in some the division of the apex into two or three small, short, unequal points, slightly recurved, and arranged in a linear series. A certain number of them also have the apex tinged with red, nearly of the same shade as the teeth of some Shrews.

There can be no doubt that the Acanthopterygian with cycloid scales which is found in certain springs, both fresh and salt, of the Algerian Sahara, and which, in several places, has been seen issuing with the waters of these springs, or those of artesian wells, in the same way as the Cyprinodons already mentioned, is the same fish as the Bolti of the Nile; it enters, therefore, with this into the genus *Tilapia*. The *Tilapia Sparmanni* is itself a Bolti; and it is not certain that the analogous fishes which have been indicated in the Gaboon and Senegal under other names are all specifically distinct from it. In any case they must be associated with it generically, as also apparently must *Haligenes Tristrami*.

* Archives du Muséum, tome x. p. 251.

† Proc. Zool. Soc. London, 1859, p. 451, pl 9. fig. B.

In describing his *Haligenes Tristrami,* Dr. Günther has called the attention of naturalists to a fish, of the Mediterranean region of Africa, with regard to which science still possesses but few details, namely the *Sparus Desfontainii* of Lacépède*, which Cuvier and Valenciennes have placed among the *Chromides* under the name of *Chromis Desfontainii.* It would be the more interesting to know what relations this supposed *Sparus* or *Chromis* may have with the Bolti, as, like the latter, it is not found in the sea. Lacépède tells us that it was discovered by the celebrated botanist whose name it bears in the hot waters (+ 30° R.) of the town of Cafsa in Tunisia; this water is potable when allowed to cool. Lacépède adds that Desfontaines also met with fishes of this species in the rivulets of cold and brackish water which irrigate the date-plantations at Tozzer, likewise in the district of Tunis. Under the name of *Chromis Desfontainii* the museum possesses some fishes which come precisely from the thermal waters of Cafsa; and M. Duméril, with his usual complaisance, has been kind enough to afford me facilities for examining them, as well as many other rare species which I required to study in order to confirm the conclusions of this investigation.

Sparus Desfontainii is neither a *Sparus* nor a *Tilapia,* that is to say, a Chromide of the same genus as the Bolti. In fact, although it has the jaws furnished with teeth of nearly the same form as in the latter, which distinguishes it from the *Spari,* it is clearly separated from the Bolti by the ctenoid form of most of its scales, and in this respect presents the ordinary condition of the Acanthopterygii. It teeth and its scaling, therefore, approximate it more to *Glyphisodon* than to any other genus; and it is with the Pharyngognathi of this genus that it must be classed, unless we prefer to regard it, especially on account of its habitat, as forming a separate genus; for the Glyphisodons are marine fishes. I do not, however, consider myself authorized, by the comparisons which I have hitherto been able to make, to separate *Sparus Desfontainii* from *Glyphisodon*; and I do not doubt that M. Valenciennes, who wished to make the Coptodon a species of this genus†, notwithstanding its cycloid scales, would have expressed the same opinion with regard to the fish from Cafsa.

Independent of the data which it may furnish for the nomenclature of ichthyology, this little discussion leads us to the remark, certainly worthy of being brought forward, that the continental waters of the Mediterranean region of Africa contain a fish evidently nearly allied by its principal characters to the

* Histoire des Poissons, iv. pp. 161 & 162.

† *Glyphisodon Zillii,* Valenciennes, *loc. cit.*

marine species to which the generic name *Glyphisodon* has been given; and yet there are no species of *Glyphisodon* in the Mediterranean sea. This species must finally be compared with the numerous Pharyngognathi, often taken for *Chromides*, which MM. Natterer and De Castelnau* have brought from the great rivers of intertropical America, although we may be sure, by the knowledge of its maxillary teeth, and the comparison of its pharyngeal teeth with those of the species taken by M. Heckel† as the types of his different genera, that *Sparus Desfontainii* has more analogy with the Glyphisodonts than with the best-known American species.

In the reflections with which Mr. Tristram has accompanied the description of the species, probably identical with the Bolti, to which Dr. Günther has given his name, this naturalist inquires whether the fish which he brought from Tuggurth is not to be regarded as a last living vestige of the fauna which peopled the Saharan sea during the Tertiary epoch, "before," as he says, "the elevation of the soil of North Africa poured into the Mediterranean the waters of this vanished ocean." I do not know whether the *Sparus Desfontainii*, a fish which approaches marine species of fishes still more closely than the Bolti, *Tilapia*, *Coptodus*, or *Haligene*, can serve as an argument in favour of this opinion. Before according any credit to such an hypothesis as this, I should like to know that the same species of Fish had been observed in the marine strata deposited during the period to which this supposition would make it ascend; and this has not been done; but, as regards *Haligenes Tristrami* and its companion in its habitat (and, no doubt, synonym), *Coptodus Zillii*, I cannot avoid remarking how much their identification with the Bolti or *Chromis* of the Nile and other fresh waters of Africa, is opposed to this supposition.

Nor do I think we have any more reason for adopting the opinion which has sometimes been put forward with regard to Cyprinodonts thrown out, like the Coptodons, by artesian wells of the Sahara, namely, that they are derived from a *sea* extending beneath this region—since, wherever they are met with, the Cyprinodons, like the Boltis themselves, are non-marine fishes, whether they have been taken in Algeria, Portugal, Spain, Syria, Egypt, Abyssinia, or even in America.

If we wished to find in geological time an equivalent to the ichthyological fauna of Algeria, which is related to the fluviatile faunas of Southern Europe or of the rest of Africa by the whole of its known genera, it is in the lacustrine deposits of the

* Animaux nouveaux ou rares de l'Amérique du Sud.
† Annales du Musée de Vienne, tome ii.

pliocene and miocene Tertiary epochs that we must seek for it. Independently of the Cyprinoidei which are chiefly characteristic of the fresh waters of our hemisphere, we find, in the gypseous beds of Montmartre, in the marls of Puy-en-Velay, in those of the Limogne d'Auvergne, and elsewhere, Cyprinodons (which have also received the generic name of *Lebias*) which have nowhere been observed in beds of marine origin.

XXV.—*Additional Notes on* Euplectella speciosa.

By Dr. J. E. Gray, F.R.S., V.P.Z.S. &c.

The great interest which the importation of more specimens of Venus's Flower-basket (*Euplectella speciosa*) has excited induces me to send you some further observations on this beautiful Sponge.

All the forty-eight or fifty specimens of the *Euplectella* that I have seen are bent on one side, as in Professor Owen's figure of *E. aspergillum*; there is one short, stouter specimen, which came with the others from Zebu, that is nearly erect, which induces me to believe that probably the *E. cucumer* of Owen is only a shorter, broader, and erect specimen of the same species.

Probably this curved form arises from the sponge growing on the perpendicular face of the cliffs in the sea; but all the specimens which I have been able to examine seem to have been attached to earth intermixed with fragments of shells, corals, &c., indicating that they most probably live on mud-banks.

It has occurred to me that this form may be produced by the crab that inhabits them. From several indications in the different specimens, there can be no doubt that the sponge when growing in the sea is rather more flexible than in the dry state in which we receive it. The crab, which is of considerable size, the thorax being about an inch and a half wide and an inch long when the tail is contracted, must enter the cavity of the sponge while it is growing, when it is more flexible, and before the netted lid is placed on the end of the central cavity, and probably when the crab itself is of a smaller size. As the crab becomes imprisoned in the cavity, it will be constantly walking up and down the tube, to procure food; and by so doing it will most likely bend the tube on one side, so that the free end of the tube may become bent down nearly to the level of the base. Most of the specimens which are brought to this country have been more or less cleaned and bleached; but there are two or three in the British Museum which appear to be in their natural state; and these seem to be more covered with the external layer of short spicules on the convex side of the curve, which would be the upper side of the sponge if it grows in this